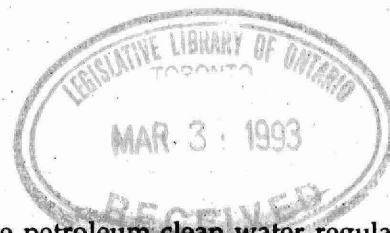




CLEAN WATER REGULATION: Petroleum Sector



The effluent limits embody the Ministry's emphasis on: pollution prevention, the reduction of wastes, and the phase-out of persistent toxic chemicals.

The draft regulation sets achievable, affordable, environmentally-sound effluent limits.

Pollution prevention is compatible with new product development, reduced water use and money-saving chemical substitutions.

Introducing a new approach to environmental protection

The proposed Effluent Limits Regulation for the Petroleum Refining Sector is the first clean water regulation to be issued under the Municipal/Industrial Strategy for Abatement (MISA) program. It takes aim at MISA's primary target: the virtual elimination of persistent toxic in municipal and industrial discharges to Ontario's lakes and rivers.

The proposed loading limits are stricter than the most stringent pollution controls in force anywhere in Canada or the United States. They are in line with the recommendations of the International Joint Commission for phasing out toxic discharges to the Great Lakes.

The regulation is a turning point in the evolution of Ontario's environmental law and is the first step in achieving pollution prevention. Pollution prevention is defined as any action which reduces or eliminates the creation of pollutants.

The regulation is unique in the way it was developed, in the way it is designed to work, and in what it attempts to do. The regulation was developed with the help of industry scientists, independent environmental experts and government officials. It sets environmentally-sound effluent limits that are designed to be realistic, practical and effective.

The petroleum clean water regulation, which proposes banning dioxins and furans, is only the first step in achieving MISA's goal. MISA initiatives will phase-out the use or release of other specific persistent toxic chemicals. And they will limit the transfer of pollutants from one environmental medium to another.

The effluent limits in the clean water regulation reflect what can be achieved using state-of-the-art pollution control systems, modern low-waste processes, and best management practices. These are affordable, reliable technologies that work. Many have already been implemented in Ontario's refineries.

The regulation will be phased in over three years from promulgation. This will give refineries time to combine their compliance programs with long-range plans for modernizing plants, upgrading aging equipment, and expanding into new product lines.

The petroleum refining sector at a glance

Ontario's petroleum refining sector, which employs some 7,200 people, processes crude oil from Western Canada to produce gasoline and other transportation fuels, heating oils, and petrochemical products. Approximately 92% of the gasoline and 78-85% of the other products are sold to consumers in Ontario.

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Ontario's refineries, for the most part, have BAT in place. Since 1974, the sector has spent an estimated \$310 million on wastewater treatment equipment.

The new regulation will bring the below-average plants up to par.

All seven of the refineries in the sector are located in South-Central Ontario, either along the shores of Lake Ontario and Lake Erie or nestled in the Sarnia area. Their treated wastewaters are discharged directly into either the St. Clair River or the lower Great lakes.

Why do we need a limits regulation?

Existing federal and provincial water pollution controls are not adequate to protect the Ontario environment from a wide variety of conventional pollutants, for example oils and total suspended solids, and persistent — and largely unregulated — toxic substances. One area of particular concern is the long-term effect of contaminants on fresh-water fish and their food sources.

Currently, Ontario's refineries have to comply with federal loading limits for five contaminants and the requirement that their effluent not kill rainbow trout. Provincial requirements are currently applied unevenly across the sector. The number of contaminants limited varies from refinery to refinery and are spelled out in a plant's Certificate of Approval. However, not all refineries are operating under a Certificate of Approval and must meet only federal standards. The clean water regulation will result in consistency for all refineries.

The development of the discharge regulation

The Effluent Limits Regulation is the end result of an exhaustive process that began with the announcement of the MISA program in 1986. The goal of MISA is the virtual elimination of all toxic contaminants in municipal and industrial discharges to Ontario's lakes and rivers.

Gathering accurate information on wastewater pollution was the first task. The Petroleum Refining Effluent Monitoring Regulation was announced in 1988, launching a year-long testing program that identified and measured the toxic contaminants in the effluents from each of the province's seven petroleum refineries. The testing was completed in November, 1989 and two reports on the monitoring data were published in 1990.

The research showed that the refineries occasionally exceeded Ontario's Effluent Quality Objectives for several conventional pollutants, such as total suspended solids, phenolics, oil and grease and ammonia and zinc. However, potentially toxic organic compounds, such as benzene and toluene which one might expect to find in refinery effluents, were only found at or near the lower limit of the detection equipment. Under the soon to be released toxic reduction plans, the ministry will be working with companies to remove or reduce these compounds.

All but one refinery passed the Ministry's fish toxicity tests; elevated levels of the toxic metals, zinc and chromium, in the wastewater from one plant were tagged as potential environmental problems. Since then, all the refineries have phased-out the use of zinc-chromium additives, and substituted less-toxic and more-easily treated phosphate-based chemicals.

The information collected during the monitoring period was used to assess which contaminants posed an environmental threat and to develop discharge limits for eleven substances. In addition to proposing a ban on dioxins and furans in wastewater, the draft

BAT is defined as the most effective technology for achieving a high degree of contaminant removal, proven on an industrial scale or by reliable pilot studies.

One study showed that the average effluent quality from Ontario's seven refineries was better than the seven best refineries in the U.S.

The regulation will cut about 300,000 kilograms of conventional pollutants and another 4,400 kilograms of toxic metals and organics from the sector's effluents each year.

regulation contains limits for the following: pH range (level of acidity/alkalinity in effluent), ammonia, sulphides, dissolved organic carbon, oil & grease, phenolics, total phosphorus (TP), total suspended solids (TSS), and volatile suspended solids (VSS).

The proposed limits reflect the low levels of contamination one could expect to find in the wastewater from a modern refinery that uses the "Best Available Technology," commonly known as BAT.

A company can often meet BAT-based limits by adopting pollution prevention management practices; for

How will the discharge regulation work?

The draft Effluent Limits propose a new standard of uniformity for the refineries across the province, as well as significantly reducing the release of contaminants into the environment. Loadings will drop by nearly 30%, cutting about 300,000 kilograms of conventional pollutants and another 4,400 kilograms of toxic metals and organics from the industry's effluents each year. The elimination of dioxins and furans to non-measurable levels will prevent the discharge of highly persistent contaminants that may build up in the food chain.

Pollutants	1989 Monitoring Discharge Levels	Expected Discharges after Regulation	Reduction of Discharges	Percent Reduction
TSS	565,600	345,000	220,600	39
VSS	365,200	253,000	112,200	31
DOC	328,320	277,770	50,550	15
Oil & Grease	30,180	26,970	3,210	11
Ammonia	57,570	53,490	4,080	7
Sulphide	1,630	1,433	197	12
Phenolics	210	160	50	24
Total Phosphorus	17,650	6,430	11,220	64

example, by substituting a less toxic chemical for a more dangerous one, or by installing a more efficient piece of process equipment. In addition, traditional and advanced abatement systems designed to treat end-of-the-pipe effluents may be used.

Most of Ontario's petroleum refineries have already implemented effective pollution prevention and wastewater abatement programs. The draft loading limits are based on the average performance of Ontario's seven refineries and will bring any below average plant up to par.

The draft regulation sets: maximum daily allowable discharges for six contaminants; (monthly averaged) daily loadings for eight contaminants; limits that can never be exceeded for three contaminants; and limits on pH (acidity and alkalinity). Dioxins and furans must not be present in the wastewater.

In common with all other sectors, refineries will be required to test the toxicity of their effluents on several varieties of fish and water fleas. Each refinery must carry out acute (short-term) lethality tests on two species.

Proposed Monthly Effluent Limits for the Petroleum Refining Sector
(figures are in Kilograms per day)

Pollutants	ESSO Sarnia	PetroCan Mississauga	Petrocan Oakville	Novocar	Shell	Suncor	ESSO Nanticoke
TSS	947	282	187	282	236	236	184
Oil & Grease	316	94	62	94	79	79	61
Ammonia	219	65	43	65	55	55	43
Sulphides	6.3	1.9	1.2	1.9	1.6	1.6	1.2
Phenolics	0.65	0.19	0.13	0.19	0.16	0.16	0.13
VSS	738	220	145	220	184	184	144
DOC	859	256	169	256	214	214	167
Total Phosphorus	41	12	8	12	10	10	8

Toxicity: final effluent must not kill fish or daphnia magna (a water flea)

Dioxins/Furans: must be non-measurable in final effluent

pH: must be in acceptable range

* The proposed limits are based on the average long-term effluent quality of the seven Ontario refineries and a flow model that considers refinery complexity and production capacity.

Once its effluent passes the acutely lethal test for 12 consecutive months, the discharger must conduct additional chronic (long-term) studies on the reproduction and survival of two different species.

The regulation also incorporates a number of other standard across-sector monitoring and reporting requirements (in common with all the effluent limit regulations being developed for other MISA sectors). Sections of the regulation govern: compliance monitoring, the location of sampling points, sampling and analytical procedures, the calculation of loadings, effluent flow measurements, monitoring quality control, stormwater controls, record-keeping, and reports to the Ministry of the Environment.

How does the regulation fit with other ministry programs?

The new petroleum refining regulation is just one part of an integrated environmental management package which emphasizes pollution prevention and waste reduction. Other MISA programs will limit the wastes that are poured into the sewer system. Waste regulations govern any dangerous materials that are trucked off-site, or are buried on the refinery property. Air pollution regulations control contaminant emissions into the atmosphere. The Spills Prevention Program requires companies to implement plans to reduce the number and severity of accidental releases. If emergencies do occur, the Environmental Protection Act ensures that the damage is cleaned up quickly and completely, and that injured parties are compensated.

Send your comments to: Ruth Grier, Minister of the Environment,
135 St. Clair
West, Toronto,
Ontario M4V 1P5

What's the next stage?

The draft discharge regulation is being released for a full 60-day review by the public, industry, environment groups and any other interested party. All the comments will be collected, reviewed and evaluated by Ministry staff, any necessary amendments will be made to the regulation, and a final draft will be published in the Ontario Gazette.

How can I learn more?

To receive more information on the Draft Effluent Limits Regulation for the Petroleum Refining Sector, fill out the coupon below and mail it to:

MISA Petroleum Refining Effluent Limits Regulation

Ontario Ministry of Environment,
135 St. Clair Avenue West,
Toronto, Ontario M4V 1P5

- ☐ Send me the Draft Petroleum Refining Effluent Limits Regulation
- ☐ Send me more information on the MISA program
- ☐ Send me list of related background documents and technical reports

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Do you have any questions or comments?

You can also call the Ministry of Environment Public Information Centre at 1-800-565-4923, or the following MOE District Offices:

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